Things to Know, Understand and Do
For Chapter 5: The Periodic Table

By the end of Chapter 5, you should

Know how to…
Explain the roles of Mendeleev and Mosely in the development of the periodic table
Describe the modern periodic table, giving properties of elements belonging to groups 1, 2, 17, 18, *d*-block, and the *f*-block
Explain how periodic law can be used to predict the physical and chemical properties of elements
Describe how the elements belonging to a group of the periodic table are interrelated in terms of atomic number
Explain the periodic law
Describe the relationship between valence electrons and the length of each period on the table
Locate and name the four blocks on the periodic table, as well as the alkali metals, alkaline earth metals, halogens, and the noble gases
Discuss the relationship between electron configurations and group numbers
Using the periodic table as a guide, write electron configurations and draw orbital energy diagrams, for any element
Define atomic and ionic radii, ionization energy, electron affinity, and electronegativity
Predict how properties of atoms - size/radius, ionization energy, electron affinity, and electronegativity- change on moving down a group or across a period of the periodic table. The general trends for these properties are as follows: • Atomic Radius (Size) decreases across a period from left to right and increases down a group. • Ionization Energy increases across a period from left to right and decreases down a group. • The electron affinity generally increases (becomes more negative) across a period from left to ring and decreases down a group, but this depends if the electron configuration of the atom before the electron is added is more or less stable than that of the resulting anion. • Electronegativity increases across a period from left to right and decreases down a group.
Explain all of the periodic trends and/or differences in these properties in a given group of atoms or ions using principles of atomic structure, and difference in nuclear charge
understand…
How Mendeleev arranged his table, and how he was able to predict the existence and properties of undiscovered elements
Why periodicity exists
How nuclear charge and electron configurations affect atomic properties
The fundamental physical properties (size/radius, ionization energy, electron affinity, and electronegativity) of the elements and their periodic trends (across a period and down a family.)
Recognize the role that ionization energy and electron affinity play in the chemistry of the elements.

Chapter 5 Homework

Read Chapter 5

Answer the following questions:

p 127 Q 2
p 139 Q 2, 4, 5
p 154 Q 1
p 155 Q 5, 13, 22, 27, 35, 36, 41